



Professional External Modem

USER'S MANUAL



560UF/L & 560UF/D External Modem



QUANTUM DATA SYSTEMS (HK) LTD.

ACTIVE Professional External Modem

USER'S MANUAL For Models: 560UF/L & 560UF/D

The contents of this manual are subject to change without prior notice.

Quantum Data Systems (H.K.) Ltd. shall not be held liable for technical or editorial omissions or errors made herein; nor for incidental or consequential damages resulting from the furnishing, performance or use of this material.

Trademarks

- Hayes - Hayes Microcomputer Products, Inc.
- MNP - Microcom Inc.
- IBM - International Business Machines Inc.
- Telix - EXIS Inc.
- BTLZ - British Telecommunications.
- Mirror III - Softklone Inc.
- Procomm - Datastorm Technologies, Inc.
- Homefax 2 - HongKong Telecom.
- Active, QFax & QCom - Quantum Data Systems (H.K.) Ltd.
- Other product names mentioned herein are registered trademarks of their own companies.

Edition 2.0 September, 2003

© 1999 Quantum Data Systems (H.K.) Ltd.

Quantum Data Systems (H.K.) Ltd.

Unit 9, 7th Floor, Block B,
Hoi Luen Industrial Centre,
55 Hoi Yuen Road, Kwun Tong, Hong Kong
Tel : (852) 2304-1199
Fax : (852) 2341-3292
Web site : <http://www.quantum.com.hk>
E-mail : info@quantum.com.hk

WARNING - AUSTRALIAN USERS

This FAX/Modem has been tested with Bitcom, Bitware for windows and fully complies with AUSTEL Technical Standards if the following conditions are followed :

- 1 THE NUNMBER OF RE-DIAL MUST NOT BE SET TO GREATER THAN 3
2. THE MODEM MUST NOT BE CONFIGURED TO THE BELL MODE OF OPERATION

Software packages other than the above, or any other configurations defined by the user, were not tested and may result in the modem being operated in a non-compliant manner.

CONSEQUENTLY, THERE WOULD BE NO PERMIT IN FORCE FOR THIS EQUIPMENT, AND THE TELECOMMUNICATIONS ACT 1991 PRESCRIBES A PENALTY OF \$12,000 FOR CONNECTION OF NON-PERMITTED EQUIPMENT.

For external modem, users must only use an ACTIVE AC Adaptor, Model

No. : 4824-1485-3AC. (Approval No. : N12430)

WARNING - SWEDISH USERS

After the country code or the digit 0 from a PBX, users must use a W to indicate dial tone detection. It is not allowed to use pause (comma) instead of dial tone detection (W).

TABLE OF CONTENTS

CHAPTER 1.	INTRODUCTION	1
CHAPTER 2.	INSTALLATION	2
CHAPTER 3.	LEASED LINE OPERATION	9
APPENDIX A.	AT COMMANDS	11
APPENDIX B.	RESULT CODES	24
APPENDIX C.	S REGISTERS	26
APPENDIX D.	CABLE PINS ASSIGNMENT	36
APPENDIX E.	SPECIFICATIONS	37
APPENDIX F.	APPLICATION EXAMPLES	39
APPENDIX G.	LED CONFIGURATION CHART FOR LEASED LINE	40

CHAPTER 1. INTRODUCTION

OVERVIEW

Congratulations on your purchase of ACTIVE Professional External Modem. The modem equips with V.42/MNP2-4 error control, V.42bis/MNP5 data compression as well as 14400bps facsimile functions. It incorporates the latest in advanced communications technology providing maximum functionality and 100% data transfer accuracy at the highest data transfer speed.

Active External modem is compatible with many terminal servers and multi-port serial adapters available world wide, such as Cisco 2500 series, Computone, Chase Research, Perle Specialix, Nortel Bay Networks, Lantronix, 3 Com, Moxa, Digi Board, Systech, Gts, Huawei, etc.

This guide describes the following models :

- 560UF/D :External dial up modem
- 560UF/L: External leased-line modem

CHAPTER 2. INSTALLATION

Carefully unpack the product package that you have received and check the contents as following:

- The modem equipment
- Telephone cable
- 5V DC power adapter & power cable
- Modem cable: 9 pins male to 9/25 pins female
- Digital User's Manual (Download from www.quantum.com.hk)

The Rear View: 560UF/L & 560UF/D External Modem



Line Jack

Only use the middle 2 pins (Pin 2 & Pin 3) to connect to the “Line” jack of the modem.

SERIAL PORT

For pin assignment, please refer to Appendix D

Install your external modem

1. Power off the computer or terminal and the modem.
2. **Modem cable:** Connect the 9-pins male modem cable to the “Serial Port” of the modem. Tighten the screws.
Connect the other end of the modem cable (9-pins & 25-pins female) to the serial port of your Computer or terminal. Tighten the screws.
3. **Telephone Line cable:** Connect one end the phone cable to the “Line” jack of the modem and the other end to the telephone line or leased-line jack.
4. **Power Adapter:** Connect the 5VDC power adapter jack to the “5V DC” port of the modem. The other end of the power cable to the 110/220 power socket.
5. Power on the computer or terminal and the modem. Configure the modem by issuing the appropriate AT commands or using the front panel switches.
6. The modem is ready for operation.

THE FRONT PANEL: 560UF/L & 560UF/D External Modem



The front panel consists of seven light indicators, a 7 segment LED and five switch buttons which are explained as follows:

Seven light indicators:

MR (Modem Ready): This light indicates the modem is ready for AT command.

TR (Terminal Ready): This light is ON when the terminal or PC (Data Terminal Equipment) is ready to send or receive data, i.e. when the Data Terminal Ready signal is ON.

CD (Carrier Detect): The Carrier Detect light is ON when a connection is made with another modem, or when the AT&C0 command is issued.

TD (Transmit Data): This indicator is ON and flashing when the terminal transmits data to the modem.

RD (Receive Data): This indicator is ON and flashing when the terminal receives data from the modem.

AA (Automatic-answer): Lights up when the modem has been set to automatic-answer mode. Also flashes when the modem has detected incoming rings.

OH (Off Hook): Lights up when the modem uses the telephone line (in the data mode). The OH indicator goes out when the modem hangs up the phone line or when it is in the Talk mode.

A 7-segment LED (optional)

Monitor the line speed. The speed may fall down or step up depending on the telephone line quality.

- 9 - 33600 bps
- 8 - 31200 bps
- 7 - 28800 bps
- 6 - 26400 bps
- 5 - 24000 bps
- 4 - 21600 bps
- 3 - 19200 bps
- 2 - 16800 bps
- 1 - 14400 bps
- 0 - 12000 bps
- A - 9600 bps
- C - 7200 bps
- E - 4800 bps
- F - 2400 bps
- H - 1200 bps
- L - 600 bps
- P - 300 bps
- F. - fax mode

Five switch buttons:**1. Normal / Config.**

Select between **Normal** and **Configuration mode**. 'POP' position is the Normal mode, 'PUSH' position is the Config. mode. In Config. mode, the modem can be configured through the front panel switches. After configuration, the modem must be set back to Normal mode.

2. Menu (menu 0 – menu C)

- a. If the modem is in Config. mode, this switch acts as a **menu pointer**.
Toggle this switch causes the modem to increase the pointer by 1.
(please refer to the section 'modem configuration table').
- b. If the modem is in Normal mode, this switch has no function.

3. T/D(Talk/Data) or Function (Function)

Operation of this switch depends on the **Normal / Config.** and the **Menu** switches.

If the modem is in **Config** mode, this switch acts as a **Function pointer**. (please refer to the section 'modem configuration table').

4. O/A (Originate/Answer) or En (Enable)

The operation of this switch depends on the **Normal / Config.** switch.

- a. If the modem is in **Normal** mode, it acts as a **O/A** switch. Toggle this switch causes the modem to change from Originate mode to Answer mode and the LED segment displays 'A.' for answer mode, or 'O.' for Originate mode.
- b. If the modem is in **Config.** mode, it acts as an **Enable** switch. Toggle this switch causes the modem to execute the selected features and LED segment shows 'U'. The features (except menu 7) were saved to NVM profile 0 automatically (please refer to the section 'modem configuration').

5. Reset switch

- Press to reset the modem during unexpected software hung-up.

Use T/D Switch to dial

1. Store a 36-digit dial string in the specified entry (n =1-3) for later dialing (AT&Zn=<T or P><tel. no> , n=1-3, i.e AT&Z1=T123456 for tone dial, AT&Z1=P123456 for pulse dial).
2. Set **Normal / Config.** Switch to PUSH position for configuration mode.
3. Toggle the **Menu** Switch to the desired Menu 7.
4. Toggle the **Function** Switch to the desired Function (n=1-3).
5. Press the **En** Switch to execute the selected features. The character 'U' is shown on the LED segment.
6. Set **Normal / Config.** Switch to POP position.
7. Press the **T/D** Switch to dial the specific entry (Dial number previously stored in directory location n using AT&Zn).

Modem Configuration Table (Further reference: Appendix G)Menu (0-C, set by **Menu** switch)

0 Factory default - &F

function (set by switch)

(0)Auto,(1)MNP,(2)Direct Mode.

1 Asyn - &Q

function

(0) Asyn

2 Type of line - &L

function

(0) Dial up, (1) 2 wire LL

3 Modulation - +MS

function

(0) auto (1) bell103, (2) V.21, (3) V.22/bell212, (4) V.22bis

(5) V.23, (6) V.32/V.32bis, (7) V.34/V.34+

4 DTE speed

function

(0) get from profile 0, (1) 115200, (2) 57600, (3) 38400, (4) 19200,

(5) 14400, (6) 9600, (7) 4800, (8) 2400, (9) 1200, (A) 300

5 TX level - S91

function

(0) -10, (1) -2, (2) -4, (3) -6, (4) -8, (5) -9, (6) -11, (7) -12, (8) -13,

(9) -14

6 Rx level - %R

function

(0) -43, (1) -33

7 Dial stored Tel. No. (please refer to the section 'Use T/D Switch to dial .')

function

(0) Normal

(1) Dial tel. no(stored by AT&Z1)

(2) Dial tel. no(stored by AT&Z2)

(3) Dial tel. no (stored by AT&Z3)

8 Smart/Dumb mode - &A

function

(0) smart, (1) dumb

9 Compression control - %C

function

(0) Enables both MNP5 and V.42bis data compression

(1) Disables data compression

(2) Enables MNP5 data compression

(3) Enables V.42bis data compression

A DTE/DCE Flow control - &K

function

(0) Enables RTS/CTS flow control

(1) Disable flow control

(2) Enables XON/XOFF flow control

(3) Enables transparent XON/XOFF flow control

(4) Enables both RTS/CTS and XON/OFF flow control (default for fax mode)

C Save to NVM memory - &W

function

(0) profile 0, (1) profile 1

Modem Configuration through front panel (also refer to modem configuration table)

To configure your modem through modem front panel switches, please follow the procedures below:

1. After the installation as described in section 'Install your modem',
2. Set **Normal / Config**. Switch to PUSH position for configuration mode.
3. Toggle the **Menu** Switch to the desired Menu (0 to C). The state is shown on the LED segment.
4. Toggle the **Function** Switch to the desired Function. The state is shown on the LED segment.
5. Press the **Enable** Switch to update the selected features. The character 'U' is shown on the LED segment. (The updated features were saved to NVM memory profile 0 automatically except menu 7).
6. To finish configuration by setting the **Normal / Config**. Switch to POP position.

Example to set up DTE speed 57600 bps and modulation V.22 bis,

1. Set **Normal / Config.** Switch to PUSH position for Config. mode.
2. Set desired DTE speed 57600 bps
Method:
Toggle the **Menu** Switch to Menu 4 (DTE speed menu), the digit '4' is shown on the LED segment. Then toggle the **Function** Switch to Function 2 (speed 57600 bps is selected), the digit '2' is shown on the LED segment. Then press the **Enable** Switch to update the DTE speed, The character 'U' is shown on the LED segment and all parameters will be saved to profile 0 automatically.
3. Set modulation V.22 bis
Method:
Toggle the **Menu** Switch to Menu 3 (modulation menu), the digit '3' is shown on the LED segment. Then toggle the **Function** Switch to Function 4 (V.22 bis is selected), the digit '4' is shown on the LED segment. Then press the **Enable** Switch to update the modulation setting, the character 'U' is shown on the LED segment and all parameters will be saved to profile 0 automatically.
4. If more settings are required (i.e tx level, flow control, etc), repeat the above steps. The above features were saved to profile 0 automatically).
5. To finish configuration by setting the **Normal / Config.** Switch to POP position.

CHAPTER 3. LEASED LINE OPERATION

This chapter tells you how to establish a leased line connection in asynchronous and synchronous modes.

What is Leased Line Operation?

In leased line operation, two modems are directly wired together by a dedicated telephone line. The register S7 does not pose a time limit on making a data connection. One modem must be set to originate mode and the other must be set to answer mode. ACTIVE modem is designed to be used with a 2-wire / 4-wire(optional) leased line

The RS-232C DTR signal must be ON to maintain the leased line data connection. If the modem detects a DTR drop during data connection, the carrier will be dropped. Once the DTR signal is restored to ON, the modem will re-start to establish data connection. The user can use the AT&D0 command to cancel the effect of DTR status on this operation. In this case, the modem will perform this operation disregard of the DTR status.

Asynchronous Power-on Leased Line (POLL) Operation

When the modem is set to POLL mode, the carrier is transmitted immediately upon powered up. The modem will wait for the remote carrier eternally until data connection is established. If the modem detects a loss of carrier during data connection, it will send the carrier for a re-connection automatically.

The following is an example to establish a Power-on 2-wire leased line (POLL) operation, Please follow the instructions below:

1. Make proper wiring connection.
2. Prepare two modems. One modem set to Answer mode, another one set to Originate mode.
Method:
Set **Normal / Config**. Switch to POP position for Normal mode. Toggle the **O/A** switch to Answer mode or Originate mode. The LED segment displays 'A.' for Answer mode, or 'O.' for Originate mode.
3. Set desired DTE speed, protocol, transmission mode, flow control, etc.
Method:
Set **Normal / Config**. Switch to PUSH position for Config mode.
DTE speed: For example, if 57600 bps DTE speed is required, toggle the **Menu** Switch to Menu 4 (DTE speed menu), the digit '4' is shown on the LED segment. Then toggle the **Function** Switch to Function 2 (speed 57600 bps is selected), the digit '2' is shown on the LED segment.

Then press the **Enable** Switch to update the DTE speed, The character 'U' is shown on the LED segment.

If more setting are required (i.e transmission mode, flow control, etc), repeat the above procedures.

4. Enable the POLL after all parameters are set.

Method:

Set **Normal / Config**. Switch to PUSH position for Config mode.

Toggle the **Menu** Switch to Menu 2 (type of line menu), the digit '2' is shown on the LED segment.

Then toggle the **Function** Switch to Function 1 (2 wire LL is selected), the digit '1' is shown on the LED segment.

Then press the **Enable** Switch to enable POLL, the character 'U' is shown on the LED segment and all parameters will be saved to profile 0 automatically.

5. To finish configuration by setting the **Normal / Config**. Switch to POP position.

You will hear the sound of modem handshaking procedure. The sound will be on until the data connection is made.

Procedure to exit the Power-On Leased Line(POLL)

1. Set **Normal / Config**. Switch to PUSH position for configuration mode.
2. Toggle the **T/D** switch to break the handshake.
3. Toggle the **Menu** Switch to Menu 2 (type of line menu), the digit '2' is shown on the LED segment.
4. Toggle the **Function** Switch to Function 0 (dial up line is selected), the digit '0' is shown on the LED segment.
5. Press the **Enable** Switch to disable POLL, the character 'U' is shown on the LED segment and all parameters will be saved to profile 0 automatically.

AT COMMAND for Leased Line Configuration

AT%On *	Select answer/originate mode	Default : 1
	%O0 Selects answer mode	
	%O1 Selects originate mode	
AT&Ln *	Transmission line type	Default : 0
	AT&L0 Dial-up line	
	AT&L1 2-wire Leased line (Option)	
AT%Rn *	Select Receive sensitivity level	Default : 0
	AT%R0 Select -43dBm receive sensitivity level	
	AT%R1 Select -33dBm receive sensitivity level	

APPENDIX A. AT COMMANDS

The PC or terminal communicates with the modem through the use of the AT commands. Your communication software will act as an interface between you and your modem. You read this chapter to customise your configuration.

To issue these industry-standard "AT" commands, first load a communication software package and then enter Terminal or Interactive Mode (Refer to your communication software manual).

All command lines must begin with the ASCII letters "AT" and end with "<Enter>" except for the A/ command and escape characters (default +++), which will be discussed later. The letters "AT" are sometimes referred to as an attention code. This command indicates to the modem that one or more commands are to follow. The "AT" and all following alphabetic characters may be in upper or lower case.

**AT must be entered in the same case such as "AT" or "at".
"At" or "aT" are not permitted.**

A series of commands can be grouped in a single line. The commands can be entered in a string with or without spaces for readability. Spaces within or between commands are ignored. The maximum number of characters in any command line is 39 (including "AT"). During the entry of a command, the backspace key can be used to correct errors with the exception of "AT".

If a syntax error is found anywhere in a command line, the remainder of the line will be ignored and the ERROR result code will be returned. Most commands entered with parameters out of range will not be accepted and the ERROR result code will be returned.

This chapter lists all the commands used to configure the modem. It includes standard Hayes AT commands, Hayes V-series commands and extended commands to control ACTIVE modem.

DESCRIPTION OF AT COMMANDS

The symbol * means command setting may be stored in one of the two user profiles with the AT&Wn command.

A/ Re-execute command

Re-executes the most recent AT command string. The principle application of connect due to a busy line, no answer, or a wrong number. This command must appear alone in a command line and must be terminated by the "/" character. (A <Enter> should not be entered to end the command.)

- +++** **Escape Characters** **Default : +**
Switch the modem from Online State to Command State without breaking the data connection. This character can be redefined by changing the value in S Register S2.
- AT=x** **Write to Selected S Register**
This command writes the value x to the currently selected S register. An S register can be selected by using the ATSn command. All of the S-register will return the OK response if x is a number.
- AT?** **Read Selected S Register**
This command reads and displays the selected S register. An S register can be selected by using the ATSn command.
- ATA** **Answer**
This must be the last command entered into the command line. The modem proceeds with the connect sequence in answer mode. The modem will enter the connect state after exchanging carrier with the remote modem. If no carrier is detected within a wait period specified in register S7(default = 50 seconds), the modem will disconnect. Any character may be entered via the DTE during the connect sequence to abort the command.
- ATBn *** **Set ITU-T or Bell mode** **Default : 0**
ATB0 Selects ITU-T V.22 and V.21 standards for communication at 1200 and 300bps
ATB1 Selects Bell 212A and 103 standards for communication at 1200 and 300bps
- ATCn** **Carrier control** **Default : 1**
This command is included for compatibility only, and has no effect other than returning a result code.

ATC1 Normal transmit carrier switching
- ATDn** **Dial**
This must be the last command in a command line. ATD causes the modem to go off-hook, dial according to the parameters entered, and attempt to establish a connection.
If there are no parameters, then the modem goes off-hook in originate mode without dialling a number.
Punctuation may be used for clarity. Parentheses, hyphens and spaces are ignored. If an invalid character is entered, that character and all subsequent characters in the dial string are ignored. The modem truncates dial strings to 36 characters.
Parameters: 0-9 A B C D * # L P T R ! @ W , ; ^ S = n

0-9 DTMF digits 0 to 9

A-D	DTMF digits A ,B,C and D. These digits may be prohibited in some countries
*	The "star" digit (tone dialling only)
#	The "gate" digit (tone dialling only)
J	Perform MNP 10 link negotiation at the highest supported speed for this call (Optional)
K	Enable power level adjustment during MNP 10 link negotiation for this call (Optional)
L	Dials the last dial string that was dialled
P	Use pulse dialling
T	Use DTMF dialling
R	Reverse mode. Allow the modem to call an originate-only modem by forcing the call into "answer mode". Must be entered as the last character of the command string (optional).
!	Cause the modem to go on-hook for a time defined by the value in S29 and then off-hook.
@	Cause the modem to listen for 5 seconds of silence
W	Wait up to the period of time specified in register S7 for dial tone before dialling
,	Pause for the value specified by register S8 during dial
;	Return to Command State after dialling
^	Turn on calling tone
()	Ignored, may be used to format the dial string
-	Ignored, may be used to format the dial string
<space>	Ignored, may be used to format the dial string
S=n	Dial number previously stored in directory location n using AT&Zn command

ATE * **Command echo** **Default : 1**

ATE0	Inhibits the echoing of commands
ATE1	Enables the echoing of commands

ATHn **Switch-hook control** **Default : 0**

ATH0	Cause the modem to go on-hook
ATH1	If modem is on-hook, modem goes off-hook, returns an OK response, and waits for further commands

ATIn **Identification**

I0	Reports product code
I1	Reports pre-computed checksum from ROM
I2	Computes checksum and compares it with value stored in ROM. Reports result as OK or ERROR.
I3	Reports firmware revision
I4	Reports OEM defined identifier string
I5	Reports Country Code parameter
I6	Reports firmware revision
I7	Reports modem data pump model

ATLn *	Speaker volume	Default : 2
	ATL0	Selects low speaker volume
	ATL1	Selects low speaker volume
	ATL2	Selects medium speaker volume
	ATL3	Selects high speaker volume
ATMn *	Speaker control	Default : 1
	ATM0	Speaker is always off
	ATM1	Speaker is on during handshaking in call establishment but is turned off while the modem is receiving a carrier signal from a remote modem
	ATM2	Speaker is always on
	ATM3	Speaker goes off while the modem is receiving a carrier signal from a remote modem and while the modem is dialling. However, speaker is on during answering
ATNn *	Modulation handshake	Default : 1
	ATN0	Requires the speed of the connection be that specified by the value held in S37; if S37=0, the speed of the connection must match that at which the last AT command was issued. If the selected speed can be achieved using more than one communication standard (e.g., Bell 212A or ITU-T V.22 at 1200bps), the modem also refers the selection made with the ATB command
	ATN1	Permits handshaking to occur at any speed supported by both modems. Enables automode detection. The ATB command is ignored in this mode and the modem attempts only ITU-T mode connections.
ATOn	Return to the on-line state	Default : 0
	ATO0	Causes the modem to return to the data mode
	ATO1	Causes the modem to return to the data mode and to initiate a retrain
ATP *	Set pulse dial as default	
ATQn *	Result code display	Default : 0
	ATQ0	Allows the modem to send result codes to the DTE
	ATQ1	Prohibits the modem from sending result codes to the DTE
ATSn	Establish S register n as the default register	
ATSn?	Reading S registers	
	Reads the contents of the S register. All the S registers may be read.	
ATSn=x	Writing to S registers	
	Writes the value of x to the specified S register n	

ATT *	Set tone dial as default	
ATVn *	Result code form (message control)	Default : 1
	ATV0	Allows short form (numeric) result codes to be sent
	ATV1	Allows long form (verbose) result codes to be sent
ATWn *	Negotiation progress reporting	Default : 0
	ATW0	Error-correction call progress not reported
	ATW1	Error-correction call progress reported
	ATW2	Error-correction call progress not reported. CONNECT XXXX message reports DCE speed.
ATXn *	Extended result codes	Default : 4
	ATX0	Modem ignores dial tone and busy signal. Sends CONNECT message when a connection is established by blind dialling
	ATX1	Modem ignores dial tone and busy signal. Sends CONNECT XXXX message reflecting bit rate when a connection is established by blind dialling
	ATX2	Modem ignores busy signal but waits for dial tone before dialling. If dial tone is not detected within 5 seconds, the NO DIAL TONE message is sent. Sends CONNECT XXXX message reflecting bit rate when a connection is established.
	ATX3	Modem ignores dial tone. Sends BUSY message if a busy signal is detected. Sends CONNECT XXXX message reflecting bit rate when a connection is established by blind dialling.
	ATX4	If dial tone is not detected within 5 seconds, sends NO DIAL TONE message. If busy signal is detected, sends BUSY message. Sends CONNECT XXXX message reflecting bit rate when a connection is established.
ATYn *	Control long space disconnect	Default : 0
	ATY0	Disables long space disconnect
	ATY1	Enables long space disconnect
ATZn	Reset	Default : 0
	Restore the active configuration with the user profile	
	ATZ0	Soft reset and restore stored profile 0
	ATZ1	Soft reset and restore stored profile 1
AT&An *	Handshake Abort Option	Default : 1
	AT&A0	Disables the user abort during handshaking. Once the dialling string is entered or answer is initiated, the handshaking cannot be aborted. Only dropping DTR signal (except &D0 option) and pressing T/D switch can abort the operation.
	AT&A1	Enables the user abort during handshaking. Anytime during

a handshaking sequence, the call and answer can be aborted by receiving any character from DTE.

AT&Cn * RS232-C DCD option **Default : 1**
 AT&C0 DCD is ON regardless of the state of the data carrier from the remote modem
 AT&C1 DCD follows the state of the data carrier from the remote modem

AT&Dn * RS232-C DTR option **Default : 2**
 Determines actions taken by the modem in relation to the DTR signal of the serial port.
 The action for the event that follows DTR drop indicated in the following table:

	&D0	&D1	&D2	&D3
&Q0	NONE	2	3	4
&Q1	1	2	3	4
&Q2	3	3	3	3
&Q3	3	3	3	3
&Q4	1	2	3	4
&Q5	NONE	2	3	4
&Q6	NONE	2	3	4

1 Modem disconnects and sends OK result code
 2 Modem goes into command mode if in data mode and sends the OK result code
 3 Modem disconnects, sends the OK result code, and disables auto answer while DTR is off
 4 Modem performs a warm start (i.e., same as ATZ command)

AT&Fn Restore factory configuration **Default : 0**
 &F0 Recalls factory default as V.42bis auto-reliable mode
 &F1 Recalls factory default as MNP 5 auto-reliable mode
 &F2 Recalls factory default as DIRECT mode

AT&Gn * Set guard tone **Default : 0**
 AT&G0 No guard tone
 AT&G1 550 Hz guard tone
 AT&G2 1800 Hz guard tone

AT&Jn * Telephone jack selection **Default : 0**
 This command is only included for compatibility and performs no function.
 AT&J0 Performs no function
 AT&J1 Performs no function

AT&Kn * DTE/modem flow control **Default : 3**
 AT&K0 Disables flow control
 AT&K3 Enables RTS/CTS flow control

	AT&K4	Enables XON/XOFF flow control	
	AT&K5	Enables transparent XON/XOFF flow control	
	AT&K6	Enables both RTS/CTS and XON/XOFF flow control (Default for fax mode)	
AT&Ln *	Transmission line type		Default : 0
	AT&L0	Dial-up line	
	AT&L1	2-wire Leased line (Option)	
	AT&L2	4-wire Leased line (Option)	
AT&Mn *	Communication mode		
	Same as AT&Q0-3		
AT&Pn *	Dial pulse ratio		Default : 0
	AT&P0	39%/61% make/break ratio @ 10pps	
	AT&P1	33%/67% make/break ratio @ 10pps	
	AT&P2	39%/61% make/break ratio @ 20pps	
	AT&P3	33%/67% make/break ratio @ 20pps	
AT&Qn *	Communication mode		Default : 5
	AT&Q0	Selects direct asynchronous operation	
	AT&Q1	Selects synchronous mode 1 operation	
	AT&Q2	Selects synchronous mode 2 operation	
	AT&Q3	Selects synchronous mode 3 operation	
	AT&Q4	Selects autosync operation	
	AT&Q5	Selects error correction mode	
	AT&Q6	Selects asynchronous operation in normal mode	
AT&Rn *	RS232-C RTS/CTS option		Default : 0
	AT&R0	CTS tracks RTS, CTS is turned ON in response to an OFF-to-ON transition of RTS from the local DTE after a delay period specified by register S26 in increments of 10 milliseconds.	
	AT&R1	The modem ignores RTS, CTS is held ON unless AT&K3 has been selected	
AT&Sn *	RS232-C DSR option		Default : 0
	AT&S0	DSR is always ON	
	AT&S1	DSR operates in accordance with the EIA-232-C specification	
AT&Tn *	Test and diagnostic		Default : 4
	A test can be run only when in an asynchronous operation in non-error correction mode (normal or direct mode). To terminate a test in progress, the escape sequence must be entered first, except for parameters 7 and 8. If S18 is non-zero, a test will terminate automatically after the time specified by S18 and display the OK message.		

AT&T0	Ends test in progress	
AT&T1	Initiates local analog loopback	
AT&T3	Initiates remote digital loopback locally. If no connection exists, ERROR is returned.	
AT&T4	Allows the modem to respond to a request from a remote modem for a remote digital loopback test	
AT&T5	Prohibits the modem from granting a request from a remote modem for a remote digital loopback test	
AT&T6	Initiates remote digital loopback. If no connection exists, ERROR is returned.	
AT&T7	Initiates remote digital loopback with self test. If no connection exists, ERROR is returned.	
AT&T8	Initiates local analog loopback with self test	
AT&V	View current configuration and user profiles / last connection statistics	
AT&V0	Displays the active configuration and user profiles	
AT&V1	Displays the last connection statistics	
AT&Wn	Store user profile	Default : 0
AT&W0	Save as user profile 0	
AT&W1	Save as user profile 1	
AT&Xn *	Clock source selection	Default : 0
	Select the source of the transmit clock for the synchronous operation. In asynchronous mode, the transmit and receive clock are turned OFF.	
AT&X0	Selects internal timing. The modem generates the transmit clock signal and applies it to TXCLK output (Pin 15 of RS232-C) at the serial interface	
AT&X1	Selects external timing. The local DTE sources the transmit clock signal on the XTCLK input (Pin 24 of RS232-C) of the serial interface. The modem applies this clock to TXCLK output (Pin 15 of RS232-C) at the serial interface.	
AT&X2	Selects slave receive timing. The modem derives the transmit clock signal from the incoming carrier and applies it to the TXCLK output (Pin 15 of RS232-C) at the serial interface.	
AT&Yn *	Designate default user profile	Default : 0
	Selects which user profile will be used after a hard reset.	
AT&Y0	Selects user profile 0	
AT&Y1	Selects user profile 1	
AT&Zn=x	Store phone number (n = 0 - 3)	Default : 0
	Stores a 36-digit dial string (x) in the specified entry (n) for later dialling (see ATDS=n command).	

AT\An	Maximum MNP block size	Default : 2
	AT\A0	Sets maximum block size to 64 characters
	AT\A1	Sets maximum block size to 128 characters
	AT\A2	Sets maximum block size to 192 characters
	AT\A3	Sets maximum block size to 256 characters
AT\Bn	Transmit break (n=1-9)	Default : 3
	When this command is entered during a non-MNP connection, the modem sends a break signal to the remote modem. The length of the break is 100 times the n parameter value in milliseconds. If this command is entered in MNP mode, the modem sends a link attention PDU to the remote modem.	
AT\Gn	Modem to modem flow control	Default : 0
	AT\G0	Disables flow control (XON/XOFF)
	AT\G1	Enables flow control (XON/XOFF)
AT\Jn	Enable DTE auto Rate Adjustment	Default : 0
	\J0	Disables adjustment of DTE speed to match line speed
	\J1	Enables adjustment of DTE speed to match line speed
AT\Kn	Break control	Default : 5
	When a break is received from the DTE during data transfer, the modem responds as follows:	
	AT\K0,2,4	Modem enters the online Command State without sending a break to the remote modem
	AT\K1	Modem clears the terminal and modem buffers and sends a break to the remote modem
	AT\K3	Modem does not clear the buffers but sends a break to the remote modem
	AT\K5	Modem sends a break to the remote modem in sequence with any transmitted data
	When the modem is in the online Command State during a data connection, the modem takes the following actions:	
	AT\K0,1	Modem clears the terminal buffers and sends a break to the remote modem
	AT\K2,3	Modem does not clear buffers but sends a break to the remote modem
	AT\K4,5	Modem sends a break in sequence with any transmitted data
	When a break is received from the DTE during a non-error correction mode, the modem takes the following action:	
	AT\K0,1	Modem clears the terminal buffers and sends a break to the local DTE

	AT\K2,3	Modem does not clear buffers but sends a break to the local DTE	
	AT\K4,5	Modem sends a break in sequence with any received data	
AT\Ln	MNP block transfer control		Default : 0
	AT\L0	Uses stream mode for MNP link connections	
	AT\L1	Uses block mode for MNP link connections	
AT\Nn	Operation mode control		Default : 3
	\N0	Selects normal speed buffered mode (no error correction)	
	\N1	Selects direct mode (equivalent to &M0, &Q0)	
	\N2	Selects reliable mode. Failure to make reliable connection results in the modem hanging-up	
	\N3	Selects auto-reliable mode	
	\N4	Selects LAPM error correction mode. Failure to make an LAPM error correction connection results in the modem hanging-up	
	\N5	Selects MNP error correction mode. Failure to make an MNP error correction connection results in the modem hanging-up	
AT\Vn	Connect Message		Default : 0
	AT\V0	Disable single line connect message.	
	AT\V1	Enable single line connect message	
AT%Cn *	Compression control		Default : 3
	%C0	Disables data compression	
	%C1	Enables MNP5 data compression	
	%C2	Enables V.42bis data compression	
	%C3	Enables both MNP5 and V.42bis data compression	
AT%En	Enable/disable auto-retrain		Default : 2
	Controls whether the modem will automatically monitor the line quality and request a retrain (%E1) or fall back when line quality is insufficient or fall forward when line quality is sufficient (%E2)		
	%E0	Disables line quality monitor and auto-retrain	
	%E1	Enables line quality monitor and auto-retrain	
	%E2	Enables line quality monitor and fallback/fall forward	
	%E3	Enables line quality monitor and auto-retrain, but hang-up immediately when EQM reaches hang-up threshold (fast hang-up)	
AT%L	Report received signal level		
	Returns a value identifying the received signal level. The value is implemented as follows:		
	001 =	Received level of -1dBm	

002 = Received level of -2dBm
 . .
 . .
 43 Received level of -43dBm

AT%On * Selects answer/originate mode Default : 1

%O0 Selects answer mode
 %O1 Selects originate mode

AT%Rn * Selects receive sensitivity (336RL ,336RL4 models) Default : 0

%R0 -43dBm
 %R1 -33dBm

(For 336RD cards, use on board jumper JP2 to select receive sensitivity
 JP2 1-2 shorted : -33dBm
 2-3 shorted : -43dBm)

AT%Q Report line signal quality

Returns the high-order byte of the calculated Eye Quality Monitor(EQM) value. The high-order byte can range from 0 to 127. However, when the value is $70\text{DC} \pm 10$ (depending on the line speed) or greater, the modem will automatically retrain if enabled by the AT%E1 command. The value for a normal connection ranges from about 0 to 15 and approaches 60 for a progressively poorer connection.

AT#CIDn Caller ID Default : 0

AT#CID=0 Disables Caller ID
 AT#CID=1 Enables Caller ID with formatted presentation to the DTE
 AT#CID=2 Enables Caller ID with unformatted presentation to the DTE
 AT#CID? Retrieves the current Caller ID mode from the modem
 AT#CID=? Returns the mode capabilities of the modem in a list with each element separated by commas

AT-SDR=n Enable/Disable Distinctive Ring Default : 0

AT-SDR=0 Disable Distinctive Ring. Any valid ring detected is reported as RING
 AT-SDR=1 Enable Distinctive Ring Type 1.
 AT-SDR=2 Enable Distinctive Ring Type 2.
 AT-SDR=3 Enable Distinctive Ring Type 1 and 2.
 AT-SDR=4 Enable Distinctive Ring Type 3.
 AT-SDR=5 Enable Distinctive Ring Type 1 and 3.
 AT-SDR=6 Enable Distinctive Ring Type 2 and 3.
 AT-SDR=7 Enable Distinctive Ring Type 1,2,3.

Distinctive ring type	Ring Cadence Detect Criteria
1	2.0 sec ON, 4.0 sec OFF.
2	0.8 sec ON, 0.4 sec OFF, 0.8 sec ON, 4.0 sec OFF.
3	0.4 sec ON, 0.2 sec OFF, 0.4 sec ON, 0.2 sec OFF, 0.8 sec ON, 4.0 sec OFF.

AT+MS * Select Line Modulation

The command format is : (336 models)

AT+MS=<mod>,<automode>,<min_rate>,<max_rate>

Default value is +MS=11,1,300,33600 (336 models only)

The command format is : (560 models)

AT+MS=<mod>,<automode>,<min_rate>,<max_rate>,<x_law>,<rb_signal>,<Maxup_rate>

Default value is +MS=12,1,300,56000,0,0,33600(560 models only)

AT+MS?

send a string of information to the DTE consisting of selected options.

AT+MS=?

send a string of information to the DTE consisting of supported options.

<automode>	Option Selected
0	Automode disabled
1	Automode enabled (Default)

<mod >	Modulation Selected	Possible Rates (bps) <min_rate>, <max_rate>
0	V.21	300
1	V.22	1200
2	V.22 bis	2400 or 1200
3	V.23	1200
9	V.32	9600 or 4800
10	V.32 bis	14400, 12000, 9600, 7200 or 4800
11	V.34	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800 or 2400
12	V.90	56000, 54667, 53333, 52000, 50667, 49333, 48000, 46667, 45333, 42667, 41333, 40000, 38667, 37333, 36000, 34667, 33333, 32000, 30667, 29333, 28000 (560 models only)
56	K56flex	56000, 54000, 52000, 50000, 48000, 46000, 44000, 42000, 40000, 38000, 36000, 34000, 32000 (560 model only)
64	Bell 103	300
69	Bell 212	1200

<x_law> is an optional number which specifies the codec type. The options are:

0 = u-Law

1 = A-Law

Note that ATZ will reset the <x_law> selection to 0 (u-Law)

<rb_signaling> is an optional number which enables or disable robbed bit signaling generation in a server modem or enables or disables robbed bit signaling detection in a client modem. The option are:

0 = Robbed bit signaling generation (server modem) or detection (client modem) disable.

1 = Robbed bit signaling generation (server modem) or detection (client modem) enabled.

Note that ATZ will reset the <rb_signaling> selection to 0.

Maxup_rate : The max value for this field is 33600.

APPENDIX B. RESULT CODES

ACTIVE modem responds to commands from the DTE and to activity on the line by signalling to the DTE in the form of result codes. The result codes can be sent by the modem in either short from (terse) or long form (verbose).

Short form	Long form	Short form	Long form
0	OK	1	CONNECT
2	RING	3	NO CARRIER
4	ERROR	5	CONNECT 1200
6	NO DIAL TONE	7	BUSY
8	NO ANSWER	9	CONNECT 600
10	CONNECT 2400	11	CONNECT 4800
12	CONNECT 9600	13	CONNECT 7200
14	CONNECT 12000	15	CONNECT 14400
16	CONNECT 19200	17	CONNECT 38400
18	CONNECT 57600	19	CONNECT 115200
20	CONNECT 230400	22	CONNECT 75TX/1200RX
23	CONNECT 1200TX/75RX	24	DELAYED
33	FAX	35	DATA
40	CARRIER 300	44	CARRIER 1200/75
45	CARRIER 75/1200	46	CARRIER 1200
47	CARRIER 2400	48	CARRIER 4800
49	CARRIER 7200	50	CARRIER 9600
51	CARRIER 12000	52	CARRIER 14400
53	CARRIER 16800	54	CARRIER 19200
55	CARRIER 21600	56	CARRIER 24000
57	CARRIER 26400	58	CARRIER 28800
59	CONNECT 16800	61	CONNECT 21600
62	CONNECT 24000	63	CONNECT 26400
64	CONNECT 28800	66	COMPRESSION CLASS 5
67	COMPRESSION V.42BIS	69	COMPRESSION NONE
70	PROTOCOL:NONE	77	PROTOCOL:LAPM
78	CARRIER 31200	79	CARRIER 33600
80	PROTOCOL:ALT	81	ALT-CELLULAR
84	CONNECT 33600	91	CONNECT 31200
150	CARRIER 32000	151	CARRIER 34000
152	CARRIER 36000	153	CARRIER 38000
154	CARRIER 40000	155	CARRIER 42000
156	CARRIER 44000	157	CARRIER 46000
158	CARRIER 48000	159	CARRIER 50000
160	CARRIER 52000	161	CARRIER 54000
162	CARRIER 56000	165	CONNECT 32000
166	CONNECT 34000	167	CONNECT 36000
168	CONNECT 38000	169	CONNECT 40000
170	CONNECT 42000	171	CONNECT 44000
172	CONNECT 46000	173	CONNECT 48000
174	CONNECT 50000	175	CONNECT 52000
176	CONNECT 54000	177	CONNECT 56000
178	CONNECT 230400	180	CONNECT 28000
181	CONNECT 29333	182	CONNECT 30667
183	CONNECT 33333	184	CONNECT 34667

185	CONNECT 37333	186	CONNECT 38667
187	CONNECT 41333	188	CONNECT 42667
189	CONNECT 45333	190	CONNECT 46667
191	CONNECT 49333	192	CONNECT 50667
193	CONNECT 53333	194	CONNECT 54667
+F4	+FCERROR		

APPENDIX C. S REGISTERS

Your ACTIVE modem has a number of S registers that affect various operation characteristics, let you obtain information about your modem, and let you test and configure your modem. Most of the registers have default values, which you can display or change to fit your particular requirement.

The symbol * means register value may be stored in one of the two user profiles with the AT&Wn command. Register parameter ranges from 0 - 255 unless specified.

- | | | |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| S0 * | Number of rings till auto-answer
Establishes the number of rings required before the modem answers incoming calls. Setting this register to 0 disables auto-answer mode. | Default : 2 |
| S1 | Ring counter
Number of rings which the modem detects before it answers a call. If no rings occur over an 8 second interval, this register is cleared. | Default : 0 |
| S2 * | Escape character
S2 holds the decimal value of the ASCII character used as the escape character. The default value corresponds to an ASCII '+'. A value over 127 disables the escape process, i.e., no escape character will be recognized. | Default : 43 |
| S3 | Carriage return character (Range :0-127)
Sets the command line and result code terminator character. Pertains to asynchronous operation only. | Default : 13 |
| S4 | Line feed character (Range:0-127)
Sets the character recognized as a line feed. Pertains to asynchronous operation only. The line feed control character is output after the carriage return control character if verbose result codes are used. | Default : 10 |
| S5 | Backspace character (Range:0-32)
Sets the character recognized as a backspace. Pertains to asynchronous operation only. The modem will not recognize the backspace character if it is set to a value that is greater than 32. This character can be used to edit a command line. When the echo command is enabled, the modem echoes back to the local DTE the backspace character, an ASCII space character and a second backspace character; this means a total of three characters are transmitted each time the modem processes the backspace character. | Default : 8 |

- S6 *** **Wait time for blind dialling (Range :2-255)** **Default : 2**
Sets the length of time in seconds to pause after the modem goes off-hook and before the modem dials the first digit of the telephone number. The modem always pauses for a minimum of 2 seconds even if the S6 register is set to a value less than 2 seconds. The "wait for dial tone" call progress feature (W in the dial string) will override the value in register S6. If option ATX2 or ATX4 is in effect, this register is ignored.
- S7 *** **Wait for carrier after dial (Range :1-255)** **Default : 50**
Defines two delay times in seconds:
1. During call establishment, this register establishes the time that the local modem waits for carrier from the remote modem before hanging up.
2. Sets the length of time that the modem waits when the "wait for dial tone" call progress feature (W in the dial string) is in effect.
- S8 *** **Pause time for dial delay** **Default : 2**
Sets the length of time in seconds to pause when the modem encounters the "pause during dial" call progress feature, i.e., the comma.
- S9 *** **Carrier detect response time (Range :1-255)** **Default : 6**
Determines the duration in tenth of a second which a carrier signal must be present before the modem recognizes it as a carrier. As this time is increased, there is less chance to detect a false carrier due to noise from the telephone line.
- S10 *** **Lost carrier to hang up delay (Range:1-255)** **Default : 14**
Sets the length of time in tenth of a second which the modem waits before hanging up after a loss of carrier. This allows for a temporary carrier lost without causing the local modem to disconnect. When register S10 is set to 255, the modem functions as if a carrier is always present.
The actual interval the modem waits before disconnecting is the value in register S10 minus the value in register S9. Therefore, the S10 value must be greater than the S9 value or else the modem disconnects before it recognizes the carrier.
- S11 *** **DTMF tone duration (Range :50-255)** **Default : 95**
Sets the duration in millisecond of tones in DTMF (Dual Tone Multi Frequency) dialling. This value has no effect on pulse dialling.
- S12 *** **Escape code guard time** **Default : 50**
Sets the time delay in fiftieth of a second required immediately before and after entering the escape code. The time interval between the sending of the first and second, or the second and third escape code characters must be less than the value of the guard time.
- S13** **Reserved**

S14 ***Bit mapped option**

Bit 0	0	ATT (Default)
	1	ATP
Bit 1	0	ATE0
	1	ATE1 (Default)
Bit 2	0	ATQ0 (Default)
	1	ATQ1
Bit 3	0	ATV0
	1	ATV1 (Default)
Bit 4,5,6	0	AT&K0
	3	AT&K3 (Default)
	4	AT&K4
	5	AT&K5
	6	AT&K6
Bit 7	Originate/answer	
	0	Answer
	1	Originate (Default)

S15**Reserved****S16****Bit mapped test option**

Bit 0	Local analog loopback (AT&T1)	
	0	Disabled
	1	Enabled
Bit 1	Not used	
Bit 2	Local digital loopback (AT&T3)	
	0	Disabled
	1	Enabled
Bit 3	Remote digital loopback status	
	0	Loopback off
	1	Loopback in progress
Bit 4	Remote digital loopback (AT&T6)	
	0	Disabled
	1	Enabled
Bit 5	Remote digital loopback with self test (AT&T7)	
	0	Disabled
	1	Enabled
Bit 6	Local analog loopback with self test (AT&T8)	
	0	Disabled
	1	Enabled
Bit 7	Not used	

S17**Reserved**

S18 *	Test timer	Default : 0
	Sets the length of time in second which the modem conducts a test before returning to the command mode. If this register is zero, the test will not automatically terminate; the test must be terminated from the command mode by issuing an AT&T0 or ATH command.	
S19	Reserved	
S20	Reserved	
S21 *	Bit mapped options	
	Bit 0	0 AT&J0 (Default) 1 AT&J1
	Bit 1	Reserved
	Bit 2	0 AT&R0 1 AT&R1 (Default)
	Bit 3,4	0 AT&D0 1 AT&D1 2 AT&D2 (Default) 3 AT&D3
	Bit 5	0 AT&C0 1 AT&C1 (Default)
	Bit 6	0 AT&S0 (Default) 1 AT&S1
	Bit 7	0 ATY0 (Default) 1 ATY1
S22 *	Bit mapped options	
	Bit 0,1	0 ATL0 1 ATL1 2 ATL2 3 ATL3
	Bit 2,3	0 ATM0 1 ATM1 2 ATM2 3 ATM3
	Bit 4-6	0 ATX0 4 ATX1

	5	ATX2
	6	ATX3
	7	ATX4
Bit 7		Reserved

S23 ***Bit mapped options**

Bit 0		0	AT&T5
		1	AT&T4
Bit 1-3	Local DTE rate		
		0	0-300bps
		1	600bps
		2	1200bps
		3	2400bps
		4	4800bps
		5	9600bps
		6	19200bps
		7	38400bps
Bit 4,5	Parity option		
		0	even
		1	not used
		2	odd
		3	none
Bit 6,7			
		0	AT&G0
		1	AT&G1
		2	AT&G2

S24**Reserved****S25****Delay to DTR****Default : 5**

Register S25 serves two purposes. When the modem is operating in synchronous mode 1, the value assigned to S25 specifies the length of time which the modem waits after a connection has been made before examining DTR. This allows the modem to ignore an ON-to-OFF transition of DTR giving the user sufficient time to disconnect the modem from the asynchronous terminal and attach it to a synchronous terminal, without forcing the modem back to the asynchronous command mode. During this time, the value for S25 is read in seconds (e.g., the factory-set value of 5 equals 5 seconds).

In all other modes, and after call establishment in synchronous modes 1 and 4, the value is read in 1/100 second. In any mode, a change in DTR (ON or OFF) that persists for a period shorter than the value held in S25 is ignored by the modem while it is in data mode.

S26**RTS to CTS delay interval****Default : 1**

Pertains to synchronous operation only. When CTS tracks RTS (AT&R0) and the modem detects an ON-to-OFF transition on RTS, this

register sets the time delay in hundredth of a second before the modem turns CTS ON.

S27 *

Bit mapped option

Bit 0,1,3

- 0 AT&Q0 or AT&M0
- 1 AT&Q1 or AT&M1
- 2 AT&Q2 or AT&M2
- 3 AT&Q3 or AT&M3
- 4 AT&Q4
- 5 AT&Q5
- 6 AT&Q6

Bit 2

- 0 AT&L0
- 1 AT&L1

Bit 4,5

- 0 AT&X0
- 1 AT&X1
- 2 AT&X2

Bit 6

- 0 ATB0
- 1 ATB1

Bit 7

Reserved

S28 *

Bit mapped option

Bit 0-2 Reserved

Bit 3,4

- 0 AT&P0
- 1 AT&P1
- 2 AT&P2
- 3 AT&P3

Bit 5 Reserved

Bit 6,7

- 0 AT*H0
- 1 AT*H1
- 2 AT*H2

S29

Flash Dial Modifier Time

Default : 25

Sets the length of time, in units of 10 ms, that the modem will go on-hook when it encounters the flash (!) dial modifier in the dial string. The time can be limited as it is a country dependent parameter.

S30

Disconnect Inactivity timer

Default : 0

Determines the length of time, in tenth of a second intervals, that the modem will wait before disconnecting when no data is sent or received. In MNP or V.42 mode, any data transmitted or received will reset the timer. In other modes, any data transmitted will reset the timer. The inactivity timer is incorporative in synchronous mode.

S31 *	Bit mapped option	
	Bit 0	Reserved
	Bit 1	
	0	ATN0
	1	ATN1
	Bit 2,3	
	0	ATW0
	1	ATW1
	2	ATW2
	Bit 4-7	Reserved
S32	XON Character	Default : 17(11h)
S33	XOFF Character	Default : 19(13h)
S34 - 35	Reserve d	
S36 *	Negotiate failure fallback	
	Default : 7	
	Bit 0-2	
	0	Modem disconnects
	1	Modem stays on-line and a direct mode connection is established
	2	Reserved
	3	Modem stays on-line and a normal mode connection is established
	4	A MNP connection is attempted and if it fails, the modem disconnects
	5	A MNP connection is attempted and if it fails, a direct mode connection is established
	6	Reserved
	7	A MNP connection is attempted and if it fails, a normal mode connection is established
	Bit 3-7	Reserved
S37 *	Desired line connection speed	
	Default : 0	
	This register specifies the desired line connection speed.	
	Use of the +MS command is recommended instead of the Nn and S37=x commands. Nn and S37=x commands are supported for compatibility with existing communication software.	
	0	Attempts automode connection. If N0 is active, connection is attempted at the most recently sensed DTE speed. If N1 is active, connection is attempted at the highest possible speed.
	1-3	Attempts to connect at 300bps
	4	Reserved
	5	Attempts to connect at 1200bps
	6	Attempts to connect at 2400bps
	7	Attempts to connect at V.23
	8	Attempts to connect at 4800bps

9	Attempts to connect at 9600bps
10	Attempts to connect at 12000bps
11	Attempts to connect at 14400bps
12	Attempts to connect at 7200bps

S38 **Delay before forced disconnect** **Default : 20**
 This register specifies the time delay in second between the modem's receipt of the ATH command to disconnect and the disconnect operation.

S39 * **Reserved**

S40 * **Bit mapped options (MNP)**

Bit 0	0	AT\K0
	1	AT\K1
Bit 1	0	AT\Q0
	1	AT\Q1
Bit 2		Reserved
Bit 3-5	0	AT\K0
	1	AT\K1
	2	AT\K2
	3	AT\K3
	4	AT\K4
	5	AT\K5
Bit 6,7	0	AT\A0
	1	AT\A1
	2	AT\A2
	3	AT\A3

S41 * **Bit mapped options**

Bit 0,1	0	AT%C0
	1	AT%C1
	2	AT%C2
	3	AT%C3 (Default)
Bit 2,6	0	AT%E0
	1	AT%E1
	2	AT%E2
Bit 3	0	AT\G0
	1	AT\G1
Bit 4		Reserved
Bit 5,7		Reserved

S42 - S45 Reserved

S46 * **Data compression control (Range :136,138) Default : 138**
 136 Executes error correction protocol with no comp ression
 138 Executes error correction protocol with compression

S48 * **V.42 negotiation action (Range:0,7,128) Default : 7**
 0 Disables negotiation; bypass the detection and negotiation
 phrases; and proceeds with LAP-M
 7 Negotiation enabled
 128 Negotiation disabled; bypass the detection and negotiation
 phrases; and proceed at once with the fallback action
 specified in S36. Can be used to force MNP.

S82 Break handling option (Range :3,7,128) Default : 128
 3 Expedited; Modem sends a break immediately; data
 integrity is maintained both ahead of and after the break
 7 Destructive; Modem sends a break immediately; data being
 processed by each modem at the time of the break is
 destroyed
 128 In sequence; Modem sends a break in sequence with any
 transmitted data; data integrity maintained ahead of and
 after break

S86 Connection failure cause code
 0 Normal disconnect, no error occurred
 4 Loss of carrier
 5 V.42 negotiation failed to detect an error-correction modem
 at the other end
 6 No response to feature negotiation
 7 This modem is asynchronous only; the other modem is
 synchronous only
 8 No framing technique negotiation
 9 The modems could not find a common protocol
 10 Bad response to feature negotiation
 11 No sync information from remote modem
 12 Normal disconnect initiated by the remote modem
 13 Remote modem does not respond after 10 re-transmissions
 of the same message
 14 Protocol violation

S91 PSTN transmit attenuation level (Range:0-15) Default : 10
 Sets the transmit level from 0 to -15 dBm for the PSTN mode. The
 value may be limited as it is a country dependent parameter.

S92 FAX transmit attenuation level (Range:0-15) Default : 10

Sets the transmit level from 0 to -15 dBm for the FAX mode. The value may be limited as it is a country dependent parameter.

S95 ***Extended result codes**

- | | |
|-------|-------------------------------------------------------------------------|
| Bit 0 | CONNECT result code includes DCE speed instead of DTE speed |
| Bit 1 | Append /ARQ to verbose CONNECT XXXX result code if protocol is not NONE |
| Bit 2 | Enables CARRIER XXXX result code |
| Bit 3 | Enables PROTOCOL XXXX result code |
| Bit 4 | Reserved |
| Bit 5 | Enables COMPRESSION result code |
| Bit 6 | Reserved |
| Bit 7 | Reserved |

S99**Leased line transmit level (Range:0-15)****Default : 10**

Sets the transmit level from 0 to -15 dBm for the leased line mode. The value may be limited as it is a country dependent parameter.

APPENDIX D. CABLE PINS ASSIGNMENT

For 560UF/L and 560UF/D External Modem

Pin	EIA	V.24	Abbrev.	Function
1	CF	109	CD	Carrier Detect
2	BB	104	RD	Receive Data
3	BA	103	TD	Transmit Data
4	CD	108.2	DTR	Data Terminal Ready
5	AB	102	GND	System Ground
6	CC	107	DSR	Data Set Ready
7	CA	105	RTS	Request to Send
8	CB	106	CTS	Clear to Send
9	CE	125	RI-	Ring Indicator

APPENDIX E. SPECIFICATIONS

Compatibility:

Data modem: ITU-T V.90, K56flex (560 models only),
V.34+, ITU-T V.34, ITU-T V.32bis, ITU-T V.32, ITU-T
V.22bis, ITU-T V.23, ITU-T V.22, ITU-T V.21, BELL
212A, BELL 103

Fax modem: ITU-T V.17, ITU-T V.29, ITU-T V.27ter, ITU-T V.21
channel 2

DTE-DCE Command Interface:

Fax service Class 1(EIA/TIA 578) and Class 2(EIA/TIA 598) Command Set
for Fax Modem
Enhanced AT Command Set for Data Modem

Error Control & Data Compression Protocol:

MNP Class 10 (Optional), MNP Class 2-5, ITU-T V.42/ITU-T V.42bis

Data Flow Control:

RTS/CTS, Local or Transparent XON/XOFF

Asynchronous Operation (bps):

75, 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600,
115200

Data Format (Parity/Data Length/Stop bits/Character Length) :

None/7/2/10, Odd/7/1/10, Even/7/1/10, None/8/1/10, Odd/8/1/11,
Even/8/1/11

* 11-bit characters are sensed, but the parity bits are stripped off during data
transmission in Normal and Error Correction modes. Direct mode does not
strip off the parity bits.

Transmission Line:

RJ-11

Dial & Answer:

Auto or Manual Dial, Redial and Answer, Adaptive Tone/Pulse Dial Mode

Call Progress Monitor:

Dial tone, Ring, Busy, Carrier Speed, DTE Speed, Error Control & Data
Compression Protocols

Diagnostic Test:

Loopback test (digital, analog, remote digital) with self-test

Transmit Level:

-10 dBm (Country dependent)

Receive Sensitivity:

-43dBm / -33dBm (**336 models only**)

Command Buffer:

39 characters (including "AT")

Non-volatile Memory:

Stores 2 user configuration profiles (excluding factory profile) and four 36-digit phone numbers

LED indicators:

MR(Modem Ready), TR(Terminal Ready), CD(Carrier Detect), RD(Receive Data), AA(Automatic Answer), OH(Off Hook), 7-segment LED

Front panel switch:

Normal /Config., switch, Menu switch, T/D / Function switch, O/A / En switch, Reset switch

Communication interface:

ITU-T V.24/V.28 (EIA RS232-C) DB-9 interface

Power :

Power Adapter: Input, 110 / 230 VAC. Output, 5V DC at 500 mA

Physical Dimensions:

Width: 10" (258mm) Height: 2" (30mm) Depth: 5.3" (135mm))

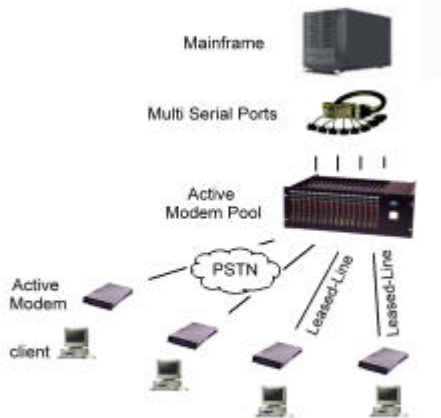
Net Weight: 0.8Kg (without power adapter)

Operating Temperature: 0 to 50

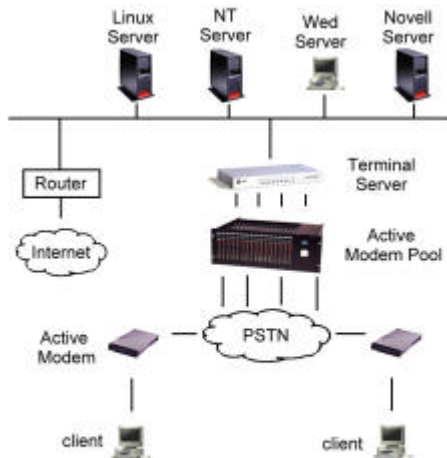
Storage Temperature: -25 to 60

Relative Humidity: 10% to 90% (non-condensing)

APPENDIX F. APPLICATION EXAMPLES



Multi-users and Leased-Line Applications



Remote Access Applications

		Functions											
Menu	AT	0=default	1	2	3	4	5	6	7	8	9	A	
0 Factory default	&F	Auto	MNP	Direct									
1 Asyn	&Q/	Asyn	Asyn only										
2 Type of line	&L	Dial up	2 wire LL										
3 Modulation	+MS	Auto	bell103	V.21	V.22/bell212	V.22bis	V.23	V.32/V.32bis	V.34/V.34+				
4 DTE speed baud		Profile0	115200	57600	38400	19200	14400	9600	4800	2400	1200	300	
5 TX level (dBm)	S91	-10	-2	-4	-6	-8	-9	-11	-12	-13	-14		
6 RX level (dBm)	%R	-43	-33										
7 Dial stored Tel.No.&Zn		Normal state	Dial & Z1	Dial & Z2	Dial & Z3								
8 mode:smart/dumb	&A	Smart	Dumb										
9 compression contro	%C	enable	Disable	MNP5	V.42bis								
A flow control DTE/D	&K	RTS/CTS	Disable	Xon/Xoff	T xon/xoff	Fax							
C save to NVM	&W	Profile 0	Profile 1										

- OH Off-Hook
- AA Auto-Answer
- RD Receive Data
- TD Transmit Data
- CD Carrier Detect
- TR Terminal Ready
- MR Modem Ready

- OH Off-Hook
- AA Auto-Answer
- RD Receive Data
- TD Transmit Data
- CD Carrier Detect
- TR Terminal Ready
- MR Modem Ready

Toggle switch **5** Reset Reset switch: Reset modem when software hung-up.

Toggle switch O/A **4** Enable Update and Save the selected menu and function to NVM Memory, profile 0 (Toggle Originate or Answer mode, when button 1 is at Normal state).

Toggle switch T/D **3** Function Select function 0 to A (Toggle Talk or Data function, when button 1 is at Normal state).

1 digit LED display **L** LED 1 digit display: Indicate Menu and function features.

Toggle switch **2** Menu Select Menu 0 to C.

Up/Down switch Normal **1** Config Down = ready to configure Menu & Function Up = normal mode

